Synthetic vesicles for metabolic energy conservation

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PROPOSITIONS

belonging to the PhD thesis

Synthetic vesicles for metabolic energy conservation

by

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1. “Omnis cellula e cellula.”
   - Rudolf Virchow (1855)

2. The *Lactococcus lactis* IL1403 arginine/ornithine antiporter is relatively slow and presumably rate-determining for ATP production from arginine breakdown.
   - This thesis, Chapter 2

3. Reconstitution of a bacterial pathway inside lipid vesicles can lead to side reactions that may not occur in the bacterium.
   - This thesis, Chapter 3

4. Coupling arginine breakdown to the glycine betaine importer OpuA allows the system to maintain a metabolic state far-from-equilibrium for many hours.
   - This thesis, Chapter 3

5. The importance of cellular homeostasis is often overlooked in studies on building of synthetic cells.
   – This thesis, Chapter 4

6. “In general, quantum mechanics does not predict a single definite result for an observation. [...] Quantum mechanics therefore introduces an unavoidable element of unpredictability or randomness into science.”
   – Stephen Hawking, A brief history of time (2016), p. 64

7. “Chemiosmotic coupling constrained the evolution of life on earth to the complexity of bacteria and archaea for billions of years. A singular event, in which one bacterium somehow got inside another one, overcame these endless energetic constraints on bacteria.”
   – Nick Lane, The vital question (2016), p. 86

8. “Many copies of good genes are dragged under because they happen to share a body with bad genes, and many perish through other forms of ill luck.”
   – Richard Dawkins, The selfish gene (2016), p. 49